

It slightly exceeded 6.00 over the greater part of those coasts, as also on portions of the coasts of Texas, North Carolina, and New England. A narrow ridge of 6.00 to 8.00 extended from central Arkansas to southern Indiana.

The *diurnal variation* is shown by Table XII, which gives the total precipitation for each hour of seventy-fifth meridian time, as deduced from self-registering gauges kept at about 43 regular stations of the Weather Bureau; of these 37 are float gauges and 6 are weighing gauges.

The *normal precipitation* for each month is shown in the Atlas of Bulletin C, entitled "Rainfall and Snow of the United States, compiled to the end of 1891, with annual, seasonal, monthly, and other charts."

The *departures* from the normal precipitation are given in Table I, which shows that there was an excess in New England, the Lake Region, Ohio Valley, south Atlantic Coast, and the northern and southern Rocky Mountain slopes.

Large excesses were: Boston, 3.40; Portland, Me., and Chicago, 2.00; Louisville, 2.90; Indianapolis, 2.89; Northfield and Hatteras, 2.60. Large deficits were: New Orleans, 3.80; Mobile, 3.50; Pensacola, 3.10; Atlanta, 3.00; Key West and Tatoosh Island, 2.40.

The *average departure* for each district is also given in Table I. By dividing these by the respective normals the following corresponding percentages are obtained (precipitation is in excess when the percentages of the normals exceed 100):

Above the normal: New England, 145; South Atlantic, 113; West Gulf, 112; lower Lake, 138; upper Lake, 116; North Dakota, 300; upper Mississippi, 109; Missouri, 112; northern Slope, 202; southern Plateau, 153.

Normal: Ohio Valley and Tennessee, 100; middle Slope, 100.

Below the normal: Middle Atlantic, 88; Florida Peninsula, 86; east Gulf, 30; Abilene, (southern Slope), 89; middle Plateau, 86; northern Plateau, 92; north Pacific, 86; middle Pacific, 85; south Pacific, 65.

The *years of greatest and least precipitation* for November are given in the REVIEW for November, 1894. The precipitation for the current month was the greatest on record at: Northfield, 5.68; Toledo, 5.03; Louisville, 7.01; Wichita, 1.80; Kansas City, 3.05; St. Vincent, 1.21; Williston, 1.91; Miles City, 0.77; Rapid City, 1.03; Lander, 2.30. It was the least on record at: Sault Ste. Marie, 1.51; Green Bay, 1.50; Port Eads, 0.64.

The *total accumulated monthly departures* from normal precipitation, from January 1 to the end of the current month, are given in the second column of the following table; the third column gives the ratio of the current accumulated precipitation to its normal value.

Districts.	Accumulated departures.	Accumulated precipitation.	Districts.	Accumulated departures.	Accumulated precipitation.
	Inches.	Perc.		Inches.	Perc.
Florida Peninsula.....	+ 0.10	100	New England.....	- 4.80	88
Abilene (southern Slope)...	+ 5.80	123	Middle Atlantic.....	- 8.80	79
Southern Plateau.....	+ 0.80	108	South Atlantic.....	- 5.00	91
			East Gulf.....	- 7.30	85
			West Gulf.....	- 6.10	88
			Ohio Valley and Tenn....	- 11.40	74
			Lower Lakes.....	- 7.40	77
			Upper Lakes.....	- 8.00	74
			North Dakota.....	- 0.80	96
			Upper Mississippi.....	- 8.80	74
			Missouri Valley.....	- 5.00	84
			Northern Slope.....	- 0.20	90
			Middle Slope.....	- 1.60	92
			Middle Plateau.....	- 1.80	83
			Northern Plateau.....	- 4.20	71
			North Pacific.....	- 8.70	83
			Middle Pacific.....	- 3.00	88
			South Pacific.....	- 3.30	77

XIII and XIV. The total snowfall at each station is given in Table II. Its geographical distribution is given on Chart No. VI of total monthly snowfall. The isotherms of minimum 32° and 40° are also shown on this chart for comparison with the snow limit.

The depth of snow on the ground at the close of the month is shown on Chart VII.

HAIL.

The following are the dates on which hail fell at one or more stations in the respective States:

Arizona, 12. Arkansas, 25. California, 3. Colorado, 4. Connecticut, 2. Iowa, 6. Maryland, 10. Nebraska, 5. New Mexico, 4, 12. Oregon, 13, 20, 27 to 30. Rhode Island, 2. South Dakota, 5. Washington, 2, 28. West Virginia, 12, 28, 29.

SLEET.

The following are the dates on which sleet fell at one or more stations in the respective States:

Arizona, 2, 3, 4, 12, 23, 24, 25. Arkansas, 12, 24, 25. California, 3, 4, 5. Colorado, 4, 12, 21, 22. Connecticut, 2, 3, 24. Delaware, 2, 10. District of Columbia, 2, 10. Idaho, 2, 11, 13, 21, 27, 29. Illinois, 13, 19, 22 to 25. Indiana, 9, 16, 23 to 26. Indian Territory, 23, 24, 25. Iowa, 6, 7, 13, 16, 18, 19, 20, 22, 23, 24, 26, 28, 29, 30. Kansas, 12, 21 to 26, 30. Maine, 2, 21, 23, 25. Maryland, 2, 10, 26. Massachusetts, 2, 3, 10, 15, 22 to 25. Michigan, 8, 9, 15, 16, 19, 22 to 27, 29. Minnesota, 7, 13, 28, 29, 30. Mississippi, 12, 13. Missouri, 8, 9, 12, 14, 19, 20, 22 to 28, 30. Montana, 21. Nebraska, 6, 7, 13, 21, 24, 30. Nevada, 3, 4, 12, 26, 27, 29. New Hampshire, 2, 10, 14, 25, 26. New Jersey, 2, 10. New Mexico, 6, 12, 22. New York, 2, 20 to 27, 30. North Dakota, 5, 12, 13, 15, 20, 28, 29, 30. Ohio, 17 to 20, 23 to 26. Oklahoma, 6, 22, 23, 24. Oregon, 13, 14, 21. Pennsylvania, 2, 10, 22, 25, 26, 28, 29, 30. South Dakota, 7, 18, 21, 27, 28, 29. Tennessee, 10, 26. Texas, 23, 24, 25. Utah, 4, 12. Vermont, 21, 26. Virginia, 2, 10, 12, 17, 19. Washington, 10, 20, 21, 26, 27. West Virginia, 10, 20, 26. Wisconsin, 7, 8, 13, 15, 16, 19, 25, 29, 30.

SUNSHINE AND CLOUDINESS.

The quantity of sunshine, and therefore of heat, received by the atmosphere as a whole is very nearly constant from year to year, but the proportion received by the surface of the earth depends upon the absorption by the atmosphere, and varies largely with the distribution of cloudiness. The sunshine is now recorded automatically at 16 regular stations of the Weather Bureau by its photographic, and at 22 by its thermal effects. At one station records are kept by both methods. The photographic record sheets show the apparent solar time, but the thermometric sheets show seventy-fifth meridian time; for convenience the results are all given in Table XI for each hour of local mean time.

Photographic and thermometric registers give the duration of that intensity of sunshine which suffices to make a record, and, therefore, they generally fail to record for a short time after sunrise and before sunset, because, even in a cloudless sky, the solar rays are then too feeble to affect the self-registers. If, therefore, such records are to be used for determining the amount of cloudiness, they must be supplemented by special observations of the sky near the sun at these times. The duration of clear sky thus specially determined constitutes the so-called twilight correction (more properly a low-sun correction), and when this has been applied, as has been done in preparing Table XI, there results a complete record of clear sky from sunrise to sunset in the neighborhood of the sun. The twilight correction is not needed when the self-registers are used for ascertaining the duration of a special intensity of sunshine, but is necessary

Details as to excessive precipitation are given in Tables

when the duration of cloudiness is alone desired, as is usually the case.

The cloudiness is determined by numerous personal observations at all stations during the daytime, and is given in the column of "average cloudiness" in Table I; its complement, or percentage of clear sky, is given in the last column of Table XI.

COMPARISON OF DURATIONS AND AREAS.

The sunshine registers give the *duration* of direct sunshine whence the percentage of duration of possible sunshine is derived; the observer's personal estimates give the percentage of *area* of clear sky. These numbers have been brought together, side by side, in the following table, from which it appears that, in general, the instrumental record of percentages of duration of sunshine is almost always larger than the observers' personal estimate of percentages of area of clear sky; the average excess for November, 1895, is 4 per cent for photographic records, and 6 per cent for thermometric records. The details are shown in the following table:

Difference between instrumental and personal observations of sunshine.

Photographic stations.				Thermometric stations.			
	Instrumental.	Personal.	Difference.		Instrumental.	Personal.	Difference.
Phoenix, Ariz.....	81	70	11	San Francisco, Cal.....	66	63	3
San Diego, Cal.....	78	70	8	Atlanta, Ga.....	64	58	6
Santa Fe, N. Mex.....	70	65	5	Vicksburg, Miss.....	56	55	1
Dodge City, Kans.....	69	64	5	New Orleans, La.....	57	56	1
Denver, Colo.....	68	58	10	Little Rock, Ark.....	54	43	11
Eureka, Cal.....	63	58	5	Philadelphia, Pa.....	53	43	10
Savannah, Ga.....	52	50	2	Detroit, Mich.....	51	40	11
Salt Lake City, Utah.....	50	34	16	St. Louis, Mo.....	51	35	16
Galveston, Tex.....	48	46	2	Wilmington, N. C.....	50	48	2
Washington, D. C.....	46	52	-6	New York, N. Y.....	49	44	5
Kansas City, Mo.....	45	44	1	Portland, Me.....	48	38	10
Helena, Mont.....	38	34	4	Baltimore, Md.....	45	49	-4
Eastport, Me.....	37	20	17	Columbus, Ohio.....	45	31	14
Portland, Oreg. †.....	31	34	-3	Des Moines, Iowa.....	45	32	13
Cleveland, Ohio.....	28	32	-4	Rochester, N. Y.....	45	36	9
Bismarck, N. Dak.....	19	31	-12	Chicago, Ill.....	41	31	10
				Cincinnati, Ohio.....	41	37	4
				Boston, Mass.....	37	34	3
				Louisville, Ky.....	34	30	4
				Buffalo, N. Y.....	33	26	7
				Portland, Oreg. †.....	29	34	-5
				Marquette, Mich.....			

* No thermometric report.

† Records kept by both methods.

WIND.

The *prevailing winds* for November, 1895, viz, those that were recorded most frequently, are shown in Table I for the regular Weather Bureau stations.

The *resultant winds*, as deduced from the personal observations made at 8 a. m. and 8 p. m., are given in Table IX. These latter resultants are also shown graphically on Chart II, where the small figure attached to each arrow shows the number of hours that this resultant prevailed, on the assumption that each of the morning and evening observations represents one hour's duration of a uniform wind of average velocity. These figures indicate the relative extent to which winds from different directions counterbalanced each other.

The *diurnal variation* in the velocity of the wind is shown in Table VI, which gives the total movement for each hour of seventy-fifth meridian time, as deduced from self-registering anemometers at about 136 stations.

HIGH WINDS.

Maximum wind velocities of 50 miles or more per hour were reported at regular stations of the Weather Bureau as follows (maximum velocities are averages for five minutes; extreme velocities are gusts of shorter duration, and are not given in this table):

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		<i>Miles</i>				<i>Miles</i>	
Block Island, R. I.....	13	54	ne.	Hatteras, N. C.....	13	53	n.
Do.....	13	50	ne.	Independence, Cal.....	21	50	n.
Buffalo, N. Y.....	26	68	w.	Kittyhawk, N. C.....	13	54	n.
Chicago, Ill.....	27	53	s.	Do.....	13	59	n.
Cleveland, Ohio.....	26	73	s.	Do.....	13	54	n.
Detroit, Mich.....	26	78	sw.	Lexington, Ky.....	25	62	s.
El Paso, Tex.....	3	50	sw.	Louisville, Ky.....	25	50	sw.
Erie, Pa.....	26	54	sw.	Do.....	25	57	sw.
Fort Canby, Wash.....	13	72	se.	Port Huron, Mich.....	26	55	sw.
Do.....	26	62	se.	Toledo, Ohio.....	26	60	sw.
Do.....	28	78	se.	Woods Holl, Mass.....	1	50	se.
Do.....	29	60	s.	Do.....	21	52	sw.
Hatteras, N. C.....	12	54	n.				

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table X, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

The dates on which reports of thunderstorms for the whole area were most numerous, were: 5th, 29; 25th, 22; 26th, 29.

Thunderstorm reports were most numerous in: Florida, 17; Massachusetts, 15; New Jersey, 24.

Thunderstorms were most frequent in: Florida, 8; Arizona and Texas, 6; Arkansas, Georgia and Oregon, 5.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz, from the 1st to the 5th, inclusive, and also the 27th to 30th. On the remaining twenty-one days of this month 333 reports were received, or an average of about 16 per day. The dates on which the number of reports especially exceeded this average were: 9th, 142; 10th, 63; 11th, 39; 12th, 21; 23d, 28.

The ratio of the number of reports to the number of observers was largest in: Illinois, 29 per cent; Minnesota, 75; North Dakota, 80; South Dakota, 43; Wisconsin, 67.

Auroras were reported most frequently in: Minnesota, Montana and Wisconsin on nine days; Massachusetts and New York, eight; Illinois, North and South Dakota, seven.

The most important display of the month was that of the 9th, 10th, 11th, and 12th. Many observers remark on this as being one of the brightest auroras on their records.

CANADIAN DATA—THUNDERSTORMS AND AURORAS.

The only thunderstorm reported was on the 9th at Montreal.

The dates of auroras were as follows: Sydney, 11; Grand Manan, 12; Father Point, 13, 24; Quebec, 24; White River, 9; Saugeen, 12; Port Arthur, 9 to 12; Winnipeg, 9; Minnedosa, 10 to 15, 21, 23, 24; Qu'Appelle, 9; Medicine Hat, 11, 22; Swift Current, 23; Prince Albert, 22, 23, 25, 26; Edmonton, 11.

INLAND NAVIGATION.

The *extreme and average stages of water* in the rivers during the current month are given in Table VII, from which it will be seen that no river attained the danger point and that on the average the waters continued quite low, as in October. At Vicksburg the Mississippi declined steadily until the 14th, when it was 6.3 feet below the low water mark adopted as the zero of the gauge. At Memphis, Helena, Arkansas City, Greenville, and Vicksburg the mean stage of water for the month was from 2.0 to 5.7 feet below the zeros of the respective gauges. During the latter part of the month the Ohio River and its tributaries generally rose a few feet.